DOCUMENT RESUME

ED 475 631 PS 031 262

AUTHOR	Katz, Lilian G.
TITLE	Introduction to the Discussion: "Moving Up the Grades: Relationship between Preschool Model and Later School Success."
PUB DATE	2003-00-00
NOTE	14p.; In: Early Childhood Research & Practice: An Internet Journal on the Development, Care, and Education of Young Children, Spring 2003, see PS 031 261. Published bi-annually.
AVAILABLE FROM	For full text: http://ecrp.uiuc.edu/v5n1/katz.html.
PUB TYPE	Opinion Papers (120)
EDRS PRICE	EDRS Price MF01/PC01 Plus Postage.
DESCRIPTORS	Academic Achievement; Educational Research; Longitudinal Studies; *Models; Outcomes of Education; Performance Factors; Preschool Curriculum; *Preschool Education; Research Methodology; *Research Problems

ABSTRACT

A study by Rebecca Marcon, published in a preceding issue of Early Childhood Research and Practice, examined the effects of various preschool models on later academic achievement and found that an academically oriented preschool model had negative effects in later school years. This document combines a commentary by Christopher J. Lonigan and Marcon's reply. Lonigan's commentary calls into question the study's data analyses and interpretations. Marcon's reply clarifies points from the original report and provides findings from a re-examination of the data to answer Lonigan's questions. The commentary and reply are preceded by an introduction to the discussion by Lilian G. Katz. (HTH)

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ECRP
Early Childhood Research & Practice

Spring 2003
Volume 5 Number 1

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Introduction to the Discussion

Lilian G. Katz
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In this issue of *Early Childhood Research & Practice,* we are pleased to include the comments of Professor Christopher Lonigan on the article by Professor Rebecca Marcon titled "Moving up the Grades: Relationship between Preschool Model and Later School Success," published in volume 4, number 1, Spring 2002, and Professor Marcon's response to those comments. This kind of scholarly exchange is precisely what we had hoped to encourage by distributing a press release announcing the publication of Marcon's paper, and we hope that readers will find it engaging. In addition, we hope that addressing this topic and the complexities of conducting reliable longitudinal research will lead to a stronger commitment to supporting more such research. Professor Lonigan's suggestion that the distribution of the press release may have been "more about politics than about science" and his reference to "politically motivated dissemination of misinformation" should not distract us from the important issues he raises about how to interpret the complex data presented by Marcon.

Professor Lonigan is associate professor of psychology at Florida State University and associate director of the Florida Center for Reading Research (http://www.fcrr.org/). He has worked with Grover "Russ" Whitehurst, director of the Institute of Education Sciences, on emergent literacy and related issues, including the development of the National Center for Learning Disabilities' "Get Ready to Read" screening tool (http://www.getreadytoread.org/research.html). Recent publications include "Development and Promotion of Emergent Literacy Skills in Preschool Children At-Risk of Reading Difficulties" in *Preventing and Remediating Reading Difficulties: Bringing Science to Scale* (B. Foorman, ed.), and "Temperamental Basis of Anxiety Disorders in Children" (with B. M. Phillips) in *The Developmental Psychopathology of Anxiety* (M. W. Vasey & M. R. Dadds, eds.).

Professor Marcon is a developmental psychologist and a professor of psychology at the University of North Florida. After working as a school psychologist in the barrios of East Los Angeles, she has held faculty positions in the Departments of Psychology at Clemson University, Davidson College, and the University of North Florida. She was also a senior research associate in the District of Columbia Public Schools where she initiated an ongoing longitudinal study of early childhood educational practices. The research reported here has been ongoing for more than a decade, and reports of its findings have been

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published in *Early Childhood Research Quarterly, Developmental Psychology,* and other scientific journals in the field.

The issues involved in this exchange matter a great deal to all who work with young children, as we struggle to understand more fully the nature of short- versus long-term effects of the pedagogical approaches we take. It is difficult to obtain hard data on the big issues (it is fairly easy to do so on the little ones, like knowledge of the alphabet) because the definitive experiments that would be required to provide the hard data may often be unethical to conduct.

The problem is not *political* but *ideological.* Ideologies are deeply held beliefs that fill the vacuum created by the unavailability of hard data. Our best strategy in such situations is to make our ideas and the data that we do have readily available to others who can subject them to vigorous argument and debate.

We are grateful to both contributors to this discussion for helping us to think more clearly about how best to approach the scientific as well as pedagogical issues involved in supporting our young children's growth, learning, and development.

Contribute to the Discussion

If you would like to contribute to an ongoing discussion of the issues raised in Marcon's article, Lonigan's commentary, or Marcon's response to the commentary, please offer your comments here. *ECRP* editors will add substantive comments to a Comments section appended to these articles. The editors may do minor editing of comments.

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Comment on Marcon (*ECRP*, Vol. 4, No. 1, Spring 2002): "Moving up the Grades: Relationship between Preschool Model and Later School Success"

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Christopher J. Lonigan
Florida State University

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Christopher J. Lonigan
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Abstract

Commenting on Rebecca Marcon's study, which indicated that an academically oriented preschool model had negative effects in later school years, this article calls into question the study's data analyses and interpretations. The commentary asserts that there were no reliable differences in report card grades between children who attended academically directed (AD), child-initiated (CI), or middle-of-the-road (M) preschool classes by either third or fourth grades once conventional levels of statistical significance are used; a lack of follow-up analyses allows no interpretation of grade-by-preschool interaction; it was unclear how children who had been retained in grade by third grade were included in a follow-up study; and the significantly higher likelihood of retention prior to grade 3 for children who participated in CI and M type preschools is a clear finding glossed over in Marcon's report. The commentary also raises questions about the potential differences in factors responsible for preschool selection because type of preschool and preschool model were confounded in the study, and about potential context effects in the study. The commentary concludes by reiterating that the most significant finding of Marcon's study was given the least attention: that children who attended AD preschool were one-half as likely to be retained in grade by third grade than were children who had attended CI and M Model preschools.

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I was surprised the day that the press release about the article published in *Early Childhood Research & Practice*, the online journal started by the ERIC Clearinghouse on Elementary and Early Childhood Education, showed up in my mailbox. Within that press release were an intriguing set of quotations that suggested that the article by Rebecca Marcon provided clear evidence on the effects of different preschool models. I suppose that the press release did its job, at least for me, because within a few hours I was downloading the article to read (http://ecrp.uiuc.edu/v4n1/marcon.html; "Moving up the Grades: Relationship between Preschool Model and Later School Success"). Interestingly, the press release read as

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if this study provided the clear answer to questions concerning the impact of different approaches to early childhood education—despite the well-known tenet of science that no single study serves as the arbiter of any question. Yet, one of the current "battles" in early childhood education is between those who believe that anything other than a child-initiated model is developmentally inappropriate and those who believe that it is possible, developmentally appropriate, and desirable to teach children some of the skills that will help them succeed once their "formal" education starts in kindergarten and first grade. Hence, it is possible that the press release was more about politics than about science.

The bottom-line message of the article was that an academically oriented preschool model had negative effects that resonated through the early school years. I will admit, up front, that I have significant doubts that a sensible teacher-directed early childhood curriculum will have negative impacts on children. Yet, I am interested in looking at the evidence. After reading the report of the study, I believe I have some reasonable questions about the study's design and description, and I believe that these questions raise the issue of whether this study provides very much information about the effects of early childhood programs.

First, there is the issue of Type 1 error. The purpose of conducting inferential statistics on data is to prevent the support of conclusions based on spurious results. In inferential statistics terms, this means that we are typically willing to accept results if they are likely to occur by chance no more than 5 out of 100 times (i.e., $p < .05$). The analysis of multiple nonindependent outcome measures results in an increase in familywise error. That is, the likelihood of a spurious result is increased when multiple tests are conducted (i.e., the inferential probabilities are based on the assumption of independence). Most generally, researchers who conduct multiple inferential tests on measures that are not independent adjust their "alpha" levels to hold familywise error at the conventional .05 level. By contrast, Dr. Marcon reports the results of 12 nonindependent comparisons for preschool type and 12 nonindependent comparisons for gender in each of two years. Even if we forget about the gender comparisons and the multiple years, a typical correction (e.g., modified Bonferroni procedure) would require adjusting the alpha to $p < .004$ to maintain familywise error at $p < .05$. Rather than adjusting the alpha, Dr. Marcon interpreted the comparison that yields that largest group difference as significant at $p = .07$! Therefore, the real answer from the data in this study is that there were no reliable differences in report card grades between children who attended academically directed (AD), child-initiated (CI), or middle-of-the-road (M) preschool classes in either the third or fourth grades, given that the above-mentioned $p = .07$ finding was the only contrast that even came close to being significant.

Second, analyses follow a typical order that takes into account how the different effects are decomposed. Significant results from analyses have a set of appropriate follow-up contrasts that allow the significant results from the main analyses to be interpreted. One typically examines the interaction first (here it comes last) in a sequential analysis because the main effects are interpretable only in the absence of an interaction. So, what about the interaction between year of assessment and preschool type? Here the article is on a little more stable ground in terms of Type 1 error—same 12 comparisons; same adjustment needed; but at least there are some statistics at less than the conventional $p < .05$ level. What if only overall GPA had been examined (instead of overall GPA as well as the GPA for the 11 specific subject areas)? In this case, there would be one comparison, and at $p < .05$, it is clear (despite the fact that the column in the table appears to be mislabeled) that there is a significant grade by preschool model interaction. Because it is already known that there are no group differences on this variable at either grade 3 or grade 4, one would need to conduct appropriate follow-up tests to interpret the significant interaction. What would one test? Perhaps one would want to know if the change from grade 3 to grade 4 was significant for each of the three groups. Perhaps one would want to know if the rate (or direction) of change differed significantly for all three groups, rate of change for one group differed significantly from the other two, or if rate of change for one group differed significantly from only one other group. None of these tests was reported. Therefore, the article provides no information on how to interpret the interaction—other than to know that it does not result in a significant difference between the groups at grade 4 (or grade 3).

The comparisons and discussion of Type 1 error above are complicated by the fact that there seem to be different children included in the different analyses. That is, the children included in the analyses comparing children from different preschool models across years represent a subset of children in the preschool model comparison for the separate years. It is not clear why a single set of analyses on children for whom data were available in both years was not what was reported.

Third, the information reported in the article limits what we know about what was actually tested. The article notes that 20% of the sample had been retained in grade by the third grade. The article further notes that children who had attended CI and M preschools were significantly more likely to have been retained in grade prior to the third grade than children who attended AD preschools—and this difference was very strong for the boys. There is a single sentence in the article that reads, "The academic performance of children who were 'on schedule' at the end of Year 5 (grade 3), as well as performance of children who had been retained prior to third grade, was examined in this follow-up study" to describe the children included in the sample. What does this mean? How were those children who were retained in grade—the majority of whom came from CI and M preschools—included in the sample?

The answer to this question could have significant influence on the results. Was it the case that the data for children retained in grade were collected in Year 6 and Year 7 so that they contributed report card grades from their third- and fourth-grade classes (like the students who were not retained)? Was it the case that whatever grade they were in at the time of Year 5 and Year 6 were the grades from which report cards used? One can imagine that you are likely to receive better grades the second time you complete a particular grade than the first time you completed it. Hence, if 20% of children who had been in CI and M classrooms contributed report cards from their repeat of a grade, it is perhaps not surprising that they appear to have higher grades (leaving aside for the moment the likelihood that teachers may be more inclined to give higher grades to children who have already repeated a grade). Moreover, children from AD preschools are contributing grades based on significantly more difficult material under this scenario. If 20% of children who had attended CI and M preschools contributed data after an extra year of schooling (i.e., their third- and fourth-grade report cards were used), would it not be expected that they would do better than children with less time in school? Certainly, one of the most consistent findings from educational research is that more time-on-task predicts higher scores.

In either case, there is something of an apples and oranges comparison being made here. However, it would not be very informative to conduct the comparison excluding children who were retained in grade—except to provide a very weak test of the author's preferred hypothesis—because only the most academically capable children would still be included in the CI and M preschool groups. However, it would perhaps be telling—except that it would be confirmation of the null hypothesis—if children from AD preschools scored as well as children from CI or M preschools once those children retained in grade were excluded from the analysis. More telling would be if children from AD classrooms scored better than children from CI or M preschools once children retained in grade were excluded from the analysis.

It seems that one clear result that is being glossed over in the article is the significantly higher likelihood of retention prior to grade 3 for children who participated in CI and M preschools. One could almost declare that the "game" was over at that outcome, and CI and M had lost. Imagine a scenario in which the outcome is not report cards but quality of life following a medical procedure. If twice as many patients in one group die as in another group, there can be no question asked about quality of life (i.e., there is no quality of life when you are dead). I suppose that it is open to debate whether one can ask about school success after twice as many children in one group than in another group have already failed—although some recent reviews suggest that grade retention is a significant risk factor for negative school outcome (Jimerson & Kaufman, 2003).

Fourth, it also seems to me to be reasonable to ask about the potential differences in (perhaps unmeasured) factors responsible for preschool selection because type of preschool and preschool model were confounded in the study. That is, none of the Head Start preschools was classified as Model AD (based on the description provided, it is not possible to deduce if any were classified as Model M). However, Head Start preschools contributed 16% of the sample. If the Head Start classes were excluded, what would the proportion of Model CI and Model M classrooms have been? Given the different admissions criteria for Head Start and other preschools, such a confound between preschool models and type of preschool is potentially significant. A strong test would require that the apparent impact of Model CI classrooms not be dependent on Head Start classes (e.g., by replicating the effect with Head Start classes excluded from the analyses). In the absence of such a demonstration, the effect—if actually present once the retention issue was worked out—could not be unambiguously attributed to preschool model.

Finally, I think it is not unreasonable to ask about potential context effects in the study (e.g., overall

achievement at a particular school). Were children from the different preschool models equally likely to attend the same schools? Given the potentially subjective nature of report card grading (e.g., use of a grading "curve"), it is possible that children with quite different scores on their report cards had very similar abilities. It is a bit surprising that there was no attempt to include data from the district's standardized assessment of achievement, which in most districts is administered by the fourth grade. Such an assessment would allow an examination of how well report cards reflected student ability. In the absence of such data, it would be useful to control for context effects in the analyses.

It is absolutely reasonable and important to ask about the long-term effects of different preschool models. Significantly, the purpose of conducting scientifically valid examinations of educational practices is to understand how best to serve the needs of young children. Such decisions need to be based on the best scientific methods. The costs of poor decisions are far too high—both to the children and to society. Ultimately, the quality of the decisions is based on the quality of the evidence used.

Whereas I do not think *a priori* that academically oriented preschool experiences are harmful to children, I also do not believe that preschools should look like first- or second-grade classrooms with children spending most of their time sitting at desks or tables engaging in "academics" or "drill and kill" activities. There is a significant difference between thinking that preschool teachers can provide children with directed activities designed to promote the development of some skill and thinking that children should be engaged in some activity more appropriate for a first- or second-grade student. Parents engage in age-appropriate directed learning activities all the time; however, we do not ask if an engaged parent is ruining his or her child's intrinsic motivation for learning. Similarly, a skilled preschool teacher can engage children in responsive and interesting educational, academically oriented, activities in ways that both foster children's skills and provide enjoyment for the children. In many cases, children will, in fact, choose these same activities when they are in a free-choice period. Hiding academically relevant experiences until children are in kindergarten does not seem to be the way to promote a love of knowledge and learning.

What seems most compelling about the results reported in this study is the finding that is given the least attention. That is, children who had attended AD preschools were one-half as likely to be retained in grade by the third grade than were children who had attended CI and M preschools. What are the consequences—both in terms of socioemotional development and academic development—of being retained in grade by third grade? What impact does such early retention have on intrinsic motivation for learning? These are important questions. What is clearly not true based on the results of this study is the claim made in the article's abstract that "Children's later school success appears to have been slowed by overly academic preschool experiences that introduced formalized learning experience too early for most children's developmental status."

Let's let good science decide the best way to help children succeed in school and in life. Ultimately, what are needed are randomized controlled studies that allow unambiguous attributions of causality. Such studies are difficult and costly to conduct. However, the future of children is far too significant to let the issue be decided by fallible information. It is unlikely that the needs of children are best served by what at times seems like politically motivated dissemination of misinformation. The field needs to agree on the desired outcomes and how to measure them. Then, we can collect data that will be informative on the best way to help children achieve those outcomes.

Reference

Jimerson, S. R., & Kaufman, A. M. (2003). Reading, writing, and retention: A primer on grade retention research. *Reading Teacher, 56*, 622-635.

Author Information

Christopher Lonigan is a professor of psychology at Florida State University and associate director of the Florida Center for Reading Research. His primary research interests include the development of emergent literacy skills during the preschool period and how these skills impact later reading, development of assessment instruments that measure the key areas of emergent literacy, and evaluation of preschool interventions and curricula designed to prevent reading difficulties for preschool children who are at-risk for later academic problems. Other interests include psychiatric disorders in children as well as the overlap between psychiatric disorders and problems in reading. Recent publications include "Development and Promotion of Emergent Literacy Skills in Preschool Children At-Risk of Reading Difficulties" in *Preventing and Remediating Reading Difficulties: Bringing Science to Scale* (B. Foorman, ed.),"Family Literacy and Emergent Literacy Programs" and "Assessment of Children's Pre-literacy Skills" (with K. Keller and B. M. Phillips) in *Handbook on Family Literacy: Research and Services* (B. Wasik, ed.), and "Temperamental Basis of Anxiety Disorders in Children" (with B. M. Phillips) in *The Developmental Psychopathology of Anxiety* (M. W. Vasey & M. R. Dadds, eds.).

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Reply to Lonigan Commentary

Rebecca A. Marcon
University of North Florida

Abstract

Responding to Lonigan's commentary on her preschool models study, Marcon clarifies points from the original article and provides findings from a reexamination of the data to answer Lonigan's questions. The response first addresses the issue of retention, reiterating the possible reasons for the lower retention of students in an academically directed (AD) preschool and focusing on one: family income influences on early grade retention. It is noted that lower-income children were more likely than higher-income children to have been retained prior to third grade, and none of the Head Start children had been enrolled in an AD model preschool. Stating the rationale for analyzing data by year in school rather than by grade, thus accounting for grades repeated, the commentary points out that selection of report card grades as an outcome measure might be seen as favoring the AD approach in a school system where grades reflect number of objectives mastered in the competency-based curriculum. Lonigan's suggestions for how to deal with retained children in a longitudinal analysis prompted a reexamination of the data. The response then highlights several conclusions that stand out in the reexamination. First, the impact of the CI model on children's grades was not dependent on Head Start classrooms. Second, the decline in grades associated with the AD model was more evident among children who had never been retained. Significant correlations between report cards and scores on the standardized achievement test battery administered for the first time in third grade were found in all subject areas as well as between children's GPA and total test battery score; thus report card grades were reasonable outcomes to evaluate as an indicator of children's academic abilities. Finally, the response revisits the distinctions between different approaches, pointing out that the preschool models contrasted in the study were empirically derived and reflect a continuum of experiences not an either/or categorization. The response concludes by pointing out that although the study does not provide "the answer" to questions concerning the impact of different approaches, it does help in understanding what facilitates or possibly hinders children's progress through school by demonstrating difficulties that graduates of AD preschools encounter.

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I read with interest Professor Lonigan's comments and welcome the opportunity to address concerns he has raised. In this response, I will clarify points that were unclear in the original article and provide findings from a reexamination of the data to answer Professor Lonigan's questions.

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The issue of retention is clearly one that deserves further attention. Because I do agree with Lonigan and others that being retained in grade places the child at risk for negative school outcomes, possible reasons for the lower retention rate of Model AD children prior to third grade were discussed at length in the original article. These reasons included (1) greater continuity between the Model AD preschool experience and educational practices in the primary grades, (2) family income influences on early grade retention, and (3) the competency-based system of promotion that emphasized basic reading and arithmetic skills regardless of performance in other subject areas. After reading the commentary, I explored further the second possible explanation because "lower-income children were more likely than higher-income children to have been retained prior to third grade ($p = .01$)," and no Head Start children had been enrolled in Model AD preschools. Indeed, more Head Start children (35% of Head Start sample) than those who had attended pre-kindergarten (17% of pre-k sample) had been retained prior to third grade, $\chi^2(1, N = 159) = 3.64$, $p = .056$. Although no difference ($p = .92$) in retention rates between CI and M preschools attended by Head Start graduates was found, differential rates of retention were noted for pre-k graduates, $\chi^2(1, N = 133) = 4.35$, $p = .11$. Among pre-k graduates, the Model CI retention rate was as expected (~15%), whereas more Model M (~26%) and somewhat fewer Model AD graduates (~10%) than expected had been retained. Thus, in the full sample, the notably lower retention rate of children who had attended AD preschools could be partially attributed to these children being less poor. Lonigan's statement declaring the "game" over for Model CI is premature.

As described by Lonigan, the issue of retention does indeed complicate analysis of longitudinal data. Among researchers, there is, however, no agreed upon strategy for handling the problem. I took a developmental approach because number of years in school rather than grade may better reflect children's development during the early elementary years when progress is often uneven. The original article reported on children's progress after 5 years and 6 years of schooling, regardless of their retention status. Yes, it was the case that whatever grades children were in at the time of Year 5 and Year 6 were the grades from which report cards were used. Of those children who had been retained prior to third grade (Year 5 of school), 74% had repeated first grade and 26% had been retained at the end of second grade. Retained children did not contribute report cards from their repeat of third grade in the Year 5 analysis. In the Year 6 analysis, there were 10 third-graders who had been retained for the first time in third grade. A comparison of these 10 children's Year 5 (third grade) and Year 6 (repeated third grade) grade point average (GPA) showed they earned higher grades the second time around ($p = .04$)—with no model x year interaction noted ($p = .98$). Therefore, Lonigan is correct in predicting that children would receive better grades the second time they completed a particular grade than the first time, and that is another reason why I chose to analyze the data by year in school rather than grade in school. All children had an equal amount of time in school.

Although the approach I took is a reasonable one, it does not fully solve the dilemma of what to do with retained children in a longitudinal study. I agree with Lonigan's point that this strategy could be problematic because more "children from AD preschools (would be) contributing grades based on significantly more difficult material" due to fewer AD children in the overall sample having been retained. I was very interested in Lonigan's suggestions for dealing with this difficult problem because, contrary to his assertion that I had a preferred hypothesis in mind, I have always been interested in finding what, if any approach, would best prepare at-risk children to succeed in school. In fact, it is easy to see in published reports of the preschool findings (e.g., Marcon, 1999) and in my discussions with researchers and policy makers across the years that I expected to support the null hypothesis of no significant difference between models. If anything, the selection of report card grades as an outcome measure might be seen as favoring the AD approach in a school system where grades reflect number of objectives mastered in the competency-based curriculum. I was surprised that my initial preschool findings favored the CI approach and, therefore, proceeded to replicate earlier findings with two additional cohorts before publishing them in *Developmental Psychology*. After reading the commentary, I was eager to reexamine the data using the comparisons Lonigan proposed, although I, too, agreed that no single study could definitively answer questions about long-term effectiveness of varying preschool models.

Before presenting results of comparisons suggested by Lonigan, I would like to explain why Type I familywise (α_{FW}) error rate is not as great a worry in this study as the commentary implies. Yes, α_{FW} error can be a problem when conducting multiple statistical analyses. That is why I first analyzed children's overall GPA as a composite score. When this composite score was found to be statistically significant ($p < .05$) or approaching statistical significance ($p < .10$), univariate analyses of individual subject areas contributing to

the overall GPA were performed to aid in interpretation of findings. Year 5 and Year 6 findings for all retrieved children from the original preschool study were presented as background information for understanding the main focus of the research—transition from Year 5 to Year 6. To me the most interesting aspect of the study was the longitudinal component that could help us better understand what approaches might facilitate or hinder academic performance across this notoriously difficult transition in children's school careers.

Two points regarding error need to be addressed. First, in each yearly analysis, three statistical tests were performed on the composite GPA (one each for the A main effect: Preschool Model, the B main effect: Children's Sex, and the A x B interaction). Although these three tests were performed, "these tests are conceptualized as each constituting a separate family of tests...(with) questions of the A main effect... representing one family of questions to be addressed...Questions of the (B) main effect and interaction are considered separately because they represent conceptually distinct questions...Thus, although the alpha level for the (study) as a whole is allowed to exceed .05, the α_{FW} rate is set at .05 for each of the three families under consideration" (Maxwell & Delaney, 1990, pp. 259-260). Second, in field research, somewhat higher alpha levels than the conventional .05 level can be used if the researcher wishes to also avoid Type II error (accepting a false null hypothesis). Because of the quasi-experimental design of this study and noise associated with an array of uncontrolled error across the 5 years, I did report findings at a higher than conventional alpha level ($p < .10$). By doing so, I acknowledge that the Year 6 composite GPA result for Preschool Model ($p < .07$) is not as reliable as other reported findings that meet the conventional $p < .05$ criteria.

I should have clearly stated in both the Abstract and the Discussion that my interpretation of what happened in children's sixth year of school was based on the subsample of children for whom data were available on both sides of the Year 5 to Year 6 transition. For this transition subsample, the Model x Year interaction was significant ($p = .02$), and posthoc comparisons indicated (1) marginal increases (6%) for CI children, $F(1, 44) = 3.04$, $p = .09$; (2) nonsignificant decreases (4%) for M children, $F(1, 48) = 2.18$, $p = .15$; and (3) marginal decreases (8%) for AD children, $F(1, 41) = 3.25$, $p = .08$. But how would these findings hold up in comparisons that excluded children who had been previously retained? Would findings be similar for comparisons that included only those children who had attended pre-kindergarten and excluded Head Start graduates?

These are excellent questions, and the following table summarizes results of preschool model comparisons for children's GPA.

Preschool Model Comparison for Children's GPA

Year	All Children	Grade	"On Schedule" Children (excluding retained)
5	F (2, 153) = .47, p=.62	3	F (2, 119) = .67, p=.51
6	F (2, 176) = 2.68, p=.07 CI > AD (p<.10) M = AD CI = M	4	F (2, 120) = 5.67, p=.004 CI > AD (p<.10) M > AD (p<.01) CI = M
5 to 6	Model x Year F (2, 135) = 4.11, p=.02 ⬆CI: F(1, 44) = 3.04, p=.09 ⬇M: F(1, 48) = 2.18, p=.15 ⬇AD: F(1, 41) = 3.25, p=.08	3 to 4	Model x Year F (2, 107) = 3.92, p=.02 ⬆CI: F(1,30) = 1.23, p=.28 ⬇M: F(1, 31) = 1.70, p=.20 ⬇AD: F(1, 34) = 5.67, p=.02
			"On Schedule" Pre-K Children

Year	All Pre-K Children (excluding Head Start)	Grade	(excluding retained) (excluding Head Start)
5	F (2, 127) = .35, p=.71	3	F (2, 80) = 3.91, p=.02 CI > AD (p<.10) M > AD (p<.05) CI = M
6	F (2, 145) = 4.36, p=.02 CI > AD (p<.01) M = AD CI > M (p<.10)	4	F (2, 80) = 5.90, p=.004 CI > AD (p<.01) M > AD (p<.05) CI = M
5 to 6	Model x Year F (2, 112) = 4.08, p=.02 ⬆CI: F(1, 28) = 2.33, p=.14 ⬇M: F(1, 41) = 2.63, p=.03 ⬇AD: F(1, 41) = 2.42, p=.08	3 to 4	Model x Year F (2, 80) = 4.03, p=.02 ⬆CI: F(1, 22) = 1.54, p=.23 ⬇M: F(1, 25) = 4.77, p=.04 ⬇AD: F(1, 31) = 5.50, p=.03

Several conclusions stand out in this reexamination of findings. First, the impact of Model CI on children's grades was not dependent on Head Start classrooms. Second, the decline in grades associated with Model AD was more evident among "on schedule" children. This school system's competency-based grading system makes it difficult to assume that differences between models were the result of differential grading practices. Forty-three percent of the schools in this follow-up study contributed data for children from two or three different models. Significant correlations ($p < .001$) between report cards and scores on the standardized achievement test battery administered for the first time in third grade were found in all subject areas as well as between children's GPA and total test battery score ($r = .67$). Thus, report card grades are reasonable outcomes to evaluate as an indicator of children's academic abilities.

At this point, it would be useful to revisit the distinctions between models because Professor Lonigan's commentary does not accurately describe the different approaches. Model CI preschool teachers do not "hide academically relevant experiences until children are in kindergarten" as suggested by Professor Lonigan. And, like a parent who knows how to individualize a learning opportunity to match the interests, age, and skill level of a child, the CI preschool teacher also does so for the individual children in his or her classroom. The CI classroom is not void of any teacher-directed activities; CI teachers do initiate activities when they are needed to facilitate children's learning.

The preschool models contrasted in this study were empirically derived and reflect a continuum of experiences, not an either/or categorization. The labels placed on varying models are just shorthand descriptors for an array of beliefs and practices that differentiate these approaches (see Marcon, 1999, for a complete description). For example, when describing their practices regarding initiation of activities in a preschool classroom using a 10-point scale (1 = teacher initiated and 10 = child initiated), CI teachers had a median score of 8. AD teachers had a median score of 3. When describing their goals for preschool children on a 10-point scale (1 = academic preparation and 10 = social and emotional growth), CI teachers had a median practice score of 8 and AD teachers' median score was 4. When describing the learning format of their preschool classroom on a 10-point scale (1 = group-oriented and 10 = individualized one-to-one), CI teachers had a median score of 8, and AD teachers a 5. Perhaps the best way to summarize differences between approaches is to contrast CI and AD with Model M teachers who attempt to combine approaches. While the CI teacher does initiate classroom activities when needed to facilitate children's learning, the Model M teacher is notably more engaged in leading groups of children in less-individualized activities for greater periods of time. Compared to the AD teacher, the Model M teacher allows children greater access to

classroom materials, encourages peer interaction, and initiates fewer teacher-directed cognitive activities that are not integrated with other developmental domains. In all three approaches, preschool children are being exposed to academically relevant experiences. The difference is how these experiences are introduced and the extent to which they are balanced with other developmental domains that also prepare children to succeed in school.

Does this follow-up study provide "the answer" to questions concerning the impact of different approaches to early childhood education? Of course not. That was just hype in a press release designed to draw attention to an ongoing debate within the field. Does the study help us to better understand what facilitates or possibly hinders children's progress through school? Yes, despite the difficulty of conducting field research with all the inherent confounds and problems we encounter in real-world settings, the reexamination of these data demonstrates difficulties that graduates of AD preschools encounter. What we still need to know is why this is the case.

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